

**PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES**

**DEPARTMENT OF CHEMISTRY**

**B.Sc., (CHEMISTRY), SKILL-BASED COURSES, NON-MAJOR ELECTIVE COURSES,**

**EXTRA-CREDIT COURSES & VALUE-ADDED COURSES**

**PSO, PO & CO STATEMENTS / 2019 - 2022**

<b>PSOs</b>	<b>PROGRAMME SPECIFIC OUTCOMES</b>
PSO-1	Have appropriate knowledge in the main areas of chemical sciences.
PSO-2	Analyze and understand the experimental problems, design a problem solving method, carrying out the suitable experimental solutions.
PSO-3	Effective communication skill, develop critical thinking, be confident in carrying out all challenges.
PSO-4	Get exposure and involve in modern trends in chemical research.
PSO-5	Achieve employment in chemical related industries, public administration, academic fields and empower new avenues.
<b>B.Sc., (CHEMISTRY) / PROGRAMME OUTCOMES</b>	
<b>POs</b>	<b>Programme Outcomes</b>
PO1	Explain the scientific principles in various fields.
PO2	Display practical skills in their career, intellectual analysis of problems and lead a team, apply entrepreneurial skills and develop a leadership quality.
PO3	Enrich the academic career by doing higher education and have a successful attitude to do research.
<b>B.Sc., (CHEMISTRY) / COURSE OUTCOMES</b>	

<b>MUCC1 Core Paper – I General Chemistry - I</b>		
<b>CO</b>	<b>Description of COs</b>	<b>Bloom's Taxonomy / Cognitive Domain</b>
CO1	To Understand the Periodic table and Periodic properties.	Comprehension (Level K2)
CO2	To Gain insight into valence bond theory, molecular orbital theory and the concept of hybridization	Knowledge (Level K1)
CO3	To Describe different types of catalysis and their kinetic study focus with special focus on enzyme catalysis	Knowledge (Level K1)
CO4	To Explain the rate of chemical reaction	Knowledge (Level K1)
CO5	To Explain the theory of electrolytic conductors.	Knowledge (Level K1)
<b>MUCC2 Core Paper – II Organic Chemistry – I</b>		
CO1	To discuss the IUPAC Nomenclature of organicCompounds, Detection, Estimation and Purification techniques of organic compounds.	Knowledge (Level K1) Comprehension (Level K2)
CO2	To identify electrophiles and Nucleophiles and the chemical reactions involving these reagents.	Application (Level K3)
CO3	To Interpret the Preparations, Properties of alkanes and alkenes.	Analysis (Level K4)
CO4	To Illustrate the types of isomerism and Preparation, properties of dienes and alkynes.	Comprehension (Level K2) Application (Level K3)
CO5	To Explain the mechanism of different types of organic reactions.	Knowledge (Level K1) Application (Level K3)
<b>MUCPP1 SBC Pulp and Paper Technology</b>		
CO1	To Discuss the manufacture of pulp and the process involved	Comprehension (Level K2)
CO2	To describe the types of pulp	Knowledge (Level K1)
CO3	To Illustrate various steps involved in the manufacture of paper	Comprehension (Level K2)
CO4	To Explain the uses of paper	Knowledge (Level K1)
CO5	To identify paper Industries in India	Comprehension (Level K2)

<b>MUCC3 Core Paper - III General Chemistry - II</b>		
CO1	To Know the Structure and Compound Identification in the Solid State.	Knowledge (Level K1)
CO2	To Explain the experimental method of determination of inter planar spacing	Comprehension (Level K2)
CO3	To Understand the concept of various steps involved in metallurgical Process	Application (Level K3)
CO4	To gain knowledge and develop an understand of the kinetic theory of gases	Analysis (Level K4)
CO5	To Compare the penetrating power of alpha, beta, neutron and gamma radiation	Evaluation (Level K5)
<b>MUCDC2 SBC Dairy Chemistry</b>		
CO1	To know the general composition and factors affecting milk.	Comprehension (Level K2)
CO2	To gain knowledge on milk lipids, milk proteins and milk carbohydrates.	Comprehension (Level K2)
CO3	To study the definition and composition of creams and butter.	Knowledge (Level K1)
CO4	To know the processes involved in milk powder and ice cream making	Comprehension (Level K2)
CO5	To understand the classification and washing procedures of dairy detergents	Comprehension (Level K2)
<b>MUCC4 Core Paper - V Physical Chemistry</b>		
CO1	Understand the basic concepts of phase rule.	Comprehension (Level K2)
CO2	Know the terms involve in thermodynamics and zeroth law of thermodynamics,	Comprehension (Level K2)
CO3	Gain knowledge on thermo chemistry and chemical equilibrium	Knowledge (Level K1) Comprehension (Level K2)
CO4	Gain knowledge on laws of solution and on colligative properties of solutions	Knowledge (Level K1) Comprehension (Level K2)
CO5	Know the laws of photochemistry and concepts of fluorescence, phosphorescence and chemiluminescence	Comprehension (Level K2) Analysis (Level K4)
<b>MUCC5 Core – VI Organic, Inorganic and Analytic Chemistry</b>		
CO1	To describe the preparation , Properties and uses of alcohols, thioalcohols, ethers, thioethers.	Application (Level K3)
CO2	To discuss the preparation, properties of polyhalogen derivatives	Comprehension (Level K2)
CO3	To Illustrate the anomalous behaviour of Li, Be and the comparison of IA group elements with II A group elements.	Analysis (Level K4)

CO4	To Discuss the chemistry of p- block elements	Comprehension (Level K2) Application (Level K3)
CO5	To Explain the principles of volumetric analysis and types of Titrations.	Knowledge (Level K1)
<b>MUCA3                      Ancillary Chemistry                      Inorganic, Organic and Physical Chemistry</b>		
CO1	To Explain how to respond to common emergencies that could occur in laboratories, such as fires , explosions,chemical exposures, injuries and chemical spilks	Comprehension (Level K2)
CO2	To gain insight in to valence bond theory molecular orbital theory and the concept of hybridization	Knowledge (Level K1)
CO3	To Recognise many functional groups and their reactivity	Knowledge (Level K1)
CO4	To Explain common and long – term side effects ofChemotherapy Drugs	Comprehension (Level K2)
CO5	To understand the different theories of Catalysis.	Comprehension (Level K2)
<b>MUCTC3                      SBC                      Textile Chemistry</b>		
CO1	To understand the classification of natural fibres as vegetable fibres and animal fibres and their physical and chemicalproperties.	Comprehension (Level K2)
CO2	To know about different synthetic fibres , their manufacture and properties	Comprehension (Level K2)
CO3	To acquire knowledge about scouring and designing processes.	Comprehension (Level K2)
CO4	To acquire knowledge about principles of dyeing.	Comprehension (Level K2)
CO5	To know the principles of dyeing.	Comprehension (Level K2)
<b>MUCN1                      NME                      Modern Cosmetics</b>		
CO1	To gain knowledge of deodorants and antiperspirants, bath preparations, dental preparations	Comprehension (Level K2)
CO2	To know about depilatories, hair care preparations and hair colourants.	Comprehension (Level K2)
CO3	To know the formulation and preparation of lipsticks and manicure preparations.	Comprehension (Level K2)
CO4	To gain knowledge on man’s toiletries and rouges and eye cosmetics.	Comprehension (Level K2)
CO5	To understand about skin care preparations, toilet powders and perfumes, pigments and preservatives	Comprehension (Level K2)
<b>MUCC6                      Core VII                      Inorganic Chemistry - I</b>		
CO1	To Describe the difference between strong acids/ bases and weak acids/ bases	Knowledge (Level K1)

CO2	To Recognise which types of Isomerism are possible for a given Complex.	Comprehension (Level K2)
CO3	To understand the key Features of Co-ordination Compounds Including the variety of structure co-ordination Numerism regards and cholates etc.	Comprehension (Level K2)
CO4	Apply to write electronic Configuration of given Atomic number.	Analysis (Level K4)
CO5	To Explain the structure of metallic carbonlys and metallic nytrosyls	Knowledge (Level K1)
<b>MUCA4 Ancillary Chemistry - IV Inorganic, Organic and Physical Chemistry</b>		
CO1	To Identify the different unit operations used for the preparation of coal for its utilization in thermal power plants and cove overns	Comprehension (Level K2)
CO2	To Understand the concept of various steps involved in metallungical process	Comprehension (Level K2)
CO3	To describe the properties of polymer chemistry	Comprehension (Level K2)
CO4	To understand the applications of soaps and detergents	Comprehension (Level K2)
CO5	To derive an expression for thermodynamic work at the moving boundary of a simple compressible system	Application (Level K3)
<b>MUCFC4 SBC Forensic Chemistry</b>		
CO1	To learn crime investigation through diagnosis of poisoning and postmortem	Comprehension (Level K2)
CO2	To acquire knowledge about explosions, the causes( gelatin sticks, TDX etc) and the security measures.	Comprehension (Level K2)
CO3	To understand the methods of detecting Forgery in bank and educational records	Comprehension (Level K2)
CO4	To acquire a comprehensive knowledge about tracks and traces.	Comprehension (Level K2)
CO5	To understand the chemical methods used in crime investigation (Medical aspects).	Comprehension (Level K2) Application (Level K3)
<b>MUCC7 Core Paper - IX Organic Chemistry - II</b>		
CO1	To Discuss Bayer's Strain theory and the structure of naphthalene	Analysis (Level K4) Evaluation (Level K5)
CO2	To Arrange the acidity of Substituted Phenols with phenol	Knowledge (Level K1)
CO3	To Describe the Preparation and properties of aromatic substituted acids.	Comprehension (Level K2) Application (Level K3)

CO4	To Examine the configuration of geometrical isomers and optical isomers.	Analysis (Level K4)
CO5	To Compare the conformational isomerism with Configurational isomerism.	Comprehension (Level K2)
<b>MUCC8 Core Paper - X Inorganic Chemistry - II</b>		
CO1	To Describe the Classification of Solvents and the Chemical reactions that Occur in Liquid Ammonia	Knowledge (Level K1)
CO2	To Explain the oxides and oxyacids of bromine, interhalogen compounds & Pseudohalogens.	Knowledge (Level K1)
CO3	To Discuss the structure of diborane, preparation, Properties, structure and uses of borazoles.	Knowledge (Level K1)
CO4	To Illustrate Synthesis – Properties and uses of fluorocarbons.	Application (Level K3)
CO5	To interpret the food adulteration, classification of adulteration and food laws and standards	Application (Level K3)
<b>MUEC1 Elective I Analytical Chemistry and Elements of Organic Spectroscopy</b>		
CO1	Explain the importance of Analytical methods in qualitative and quantitative analysis	Analysis (Level K4)
CO2	To Analyse the purity of Samples and precipitates	Analysis (Level K4)
CO3	To Interpret uV, IR, Spectra and their applications	Comprehension (Level K2) Application (Level K3)
CO4	To Illustrate NMR, Mass and Raman spectra with their applications	Application (Level K3) Analysis (Level K4)
CO5	To apply different types of chromatographic techniques in separation of mixtures	Comprehension (Level K2) Application (Level K3)
<b>MUCE1 Elective - I Optional Paper Polymer Chemistry</b>		
CO1	To Explain the basic concepts of polymers.	Knowledge (Level K1)
CO2	To discuss the types of polymerizations.	Application (Level K3)
CO3	To illustrate the properties of polymer.	Comprehension (Level K2)
CO4	To describe various methods used to determine the molecular weight of polymers.	Application (Level K3)
CO5	To Explain preparation and uses of various polymers.	Application (Level K3)
<b>MUCE2 Elective – II Pharmaceutical Chemistry</b>		

CO1	To know the terminologies used in pharmaceutical chemistry	Knowledge (Level K1) Comprehension (Level K2)
CO2	To understand various traditional practice	Comprehension (Level K2)
CO3	To gain knowledge about analgesics, antiseptics & disinfectors	Comprehension (Level K2)
CO4	To know the uses of various anesthetics	Knowledge (Level K1) Comprehension (Level K2)
CO5	To gain knowledge about different types of medicines to cure various diseases.	Knowledge (Level K1) Comprehension (Level K2)
<b>MUCE2 Elective - II Optional Paper Nano Technology and Green Chemistry</b>		
CO1	To illustrate the preparation of different types of nano particles	Application (Level K3)
CO2	To know the preparations of nano materials	Comprehension (Level K2)
CO3	To discuss the applications of nano technology in nano cosmetics, textile, nano sensors, cancer therapy	Application (Level K3)
CO4	To study Solvent free microwave- assisted organic synthesis	Comprehension (Level K2) Application (Level K3)
CO5	To study the synthesis of Ionic liquids, advantages and applications of Super critical Carbondioxide.	Comprehension (Level K2) Application (Level K3)
<b>MUCLT5 SBC Leather Technology</b>		
CO1	To Explain the conventional tanning Process – Animal skin	Comprehension (Level K2)
CO2	To describe the manufacture of leather and Preparation of hides for tanning	Comprehension (Level K2)
CO3	To understand the various process of tanning- soaking , liming deliming dehairing and batins.	Comprehension (Level K2)
CO4	To illustrate the vegetable tanning, synthetic tanning & synthetic tanning & Chrome tanning.	Comprehension (Level K2)
CO5	To identify the chemical reactions and charges in contaminants.	Knowledge (Level K1)
<b>MUCC9 Core Paper IX Organic Chemistry - III</b>		
CO1	To Understand the configuration of glucose and Surcose.	Knowledge (Level K1)
CO2	To Explain the mechanism of Molecular rearrangements.	Comprehension (Level K2)
CO3	To Apply the theory of colour and constitution of dyes.	Application (Level K3)

CO4	To Interpret the significance of Alkaloids and hetrocyclic compounds	Analysis (Level K4)
CO5	To Study the preparation, Properties of Terpenoids,proteins and Nucleic acids.	Knowledge (Level K1) Application (Level K3)
<b>MUCC10 Core X Physical Chemistry - II</b>		
CO1	To know the basic concepts of spectroscopy	Application (Level K3)
CO2	To acquire knowledge on types of spectra ,diatomic molecule as harmonic and anharmonic oscillator and laser and maser.	Comprehension (Level K2)
CO3	To study the basics of quantum mechanics	Knowledge (Level K1)
CO4	To study the reaction rates and their theories, preparation and purification of colloids	Analysis (Level K4)
CO5	To aquire knowledge on liquid crystals, their types and their arrangements	Analysis (Level K4)
<b>MUCE3 Elective - III Industrial Chemistry</b>		
CO1	To describe the students well – grounded in the principles and through knowledge of Scientific techniques of industrialchemistry	Knowledge (Level K1)
CO2	To Explain the properties of Paints and varnishes	Comprehension (Level K2)
CO3	To understand the applications of soaps an detergents	Comprehension (Level K2)
CO4	To Describe the physical characteristics of Portland cement	Comprehension (Level K2)
CO5	To explain the various types of batteries.	Comprehension (Level K2)
<b>MUCE3 Elective – III Applied Chemistry</b>		
CO1	To know the systems of medicine	Comprehension (Level K2)
CO2	To aquire knowledge on chemotherapy, harmones and vitamins and their functions an anaesthetics.	Knowledge (Level K1)
CO3	To attain knowledge on preparation of rubber, polymerization and various values of oils and fats	Analysis (Level K4)
CO4	To apprehend on fertilizers, insecticides and pesticides	Application (Level K3)
CO5	Cognizant on pyrotechniques and manufacture of cement, glass and ceramics.	Application (Level K3)
<b>UGEFC Extra Credit Paper - I Food Chemistry</b>		
CO1.	To understand the chemistry of food adulteration and adulterants	Comprehension (Level K2)



CO2.	To know the chemistry of food poisoning	Comprehension (Level K2)
CO3.	To acquire knowledge about food additives	Comprehension (Level K2)
CO4	To understand the chemistry of beverages and soft drinks and to know the methods of preparing the soft drinks by field visits.	Comprehension (Level K2)
CO5.	To acquire knowledge about various edible oils and the processing techniques related to oils.	Comprehension (Level K2)
<b>UGECTL Extra-credit Course – II Chemistry in Day-to-day Life</b>		
CO1.	To learn the types of fabrics, fading, starching process.	Comprehension (Level K2)
CO2.	To acquire knowledge about types of soaps whiteners, stiffeners, flavouring agents	Comprehension (Level K2)
CO3.	To understand soft and hard utensil cleaning liquid soaps	Comprehension (Level K2)
CO4	To acquire a comprehensive knowledge about Floor cleaning agents and Anti mosquito repellent machines	Comprehension (Level K2)
CO5.	To understand the Chemicals used in water purifiers and germicidal effect of uv radiation	Comprehension (Level K2)
<b>UGEFCEI Extra Credit Paper Forensic Science and Crime Investigation</b>		
CO1.	To learn crime investigation through diagnosis of poisoning and postmortem	Comprehension (Level K2)
CO2.	To acquire knowledge about explosions, the causes (gelatin sticks, TDX etc) and the security measures.	Comprehension (Level K2)
CO3.	To understand the methods of detecting Forgery in bank and educational records.	Comprehension (Level K2)
CO4	To acquire a comprehensive knowledge about tracks and traces.	Comprehension (Level K2)
CO5.	To understand the chemical methods used in crime investigation (Medical aspects).	Comprehension (Level K2)
<b>MUES6 Environmental Studies</b>		
CO1.	To Learn the importance of Environmental studies.	Comprehension (Level K2)
CO2.	To acquire the knowledge about different types of natural resources.	Knowledge (Level K1)
CO3.	To understand Biodiversity and its conservation.	Comprehension (Level K2)
CO4.	To acquire a comprehensive knowledge about environment pollution and social issues.	Application (Level K3)
CO5.	To acquire knowledge about Human population and Environment	Knowledge (Level K1)

